

INTOXICATION WITH C-9

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Preliminary Description Of The Reaction

Definition. Intoxication with C-9 refers to the sum total of mental and physical changes induced by ingestion of this drug and is characterized by slow onset after oral ingestion, prolonged persistence of symptoms, conjunctival injection, pseudoptosis, tachycardia at rest, postural tachycardia and hypotension, and subjective symptoms which occur include drowsiness mixed with apprehension, dryness of the mouth, difficulty in thinking and concentrating, variable changes in mood, and a feeling of increased sensory perception.

Physical Properties. C-9 is an oily resin. It is soluble in organic solvents including ethyl alcohol, but is insoluble in water. Alcoholic solutions of the drug are stable for at least 8 months.

Method of Administration. Because of the drugs insolubility in water, methods of administration are limited. The drug is effective orally and may be given in food, coffee, soft drinks, or alcoholic drinks. It is also effective when dried on tobacco and smoked, although the effects are generally milder and less consistent after smoking as compared with oral ingestion.

Dosage. The present description is based on doses (total) of 0.5 to 2.5 mg. of the drug orally. Definite cardiovascular effects can be detected in doses of 0.5 mg. Definite subjective effects

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are reported with doses of 1 mg. or more. At 1 mg. level, the effects are usually regarded as pleasant by experienced marijuana users. With the higher doses, subjective effects become disagreeable even to experienced addicts. With doses of 2 mg. or more, cardiovascular effects become very prominent and fainting may occur on standing.

Time Course. Following oral ingestion both cardiovascular and subjective effects appear about one and one-half to two hours after administration of the drug. Maximum effect is reached four or five hours after the drug is given. The peak effects is maintained to about the 16th hour following administration of the drug. Some effects may persist as long as 24 to 48 hours after administration. In general, the larger the dose of C-9 that is given the longer symptoms persist.

Subjective Symptoms. During the height of the C-9 reaction (4-16 hours) the following symptoms, which are listed by organ systems, have been reported. The list does not include all symptoms that have been mentioned but only those that are frequently reported.

Special Senses.

Vision.

- (1) Blurring of vision.
- (2) Change in spatial perception.
- (3) Occasionally, elementary hallucinations (colored lights, patterns, etc.) on closing the eyes.

Taste.

- (1) Increased acuity of taste.
- (2) Dry taste.

Touch.

- (1) Numbness of one or more extremities.
- (2) Paresthesia (hot or cold feelings on the skin).

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Smell.

No symptoms reported in this area.

Gastrointestinal.

- (1) Dryness of the mouth
- (2) Decreased salivation.
- (3) Dryness of the throat.
- (4) Increased appetite (consistently reported).
- (5) Nausea and vomiting (only with the larger doses).

Cardiovascular.

- (1) Dizziness
- (2) Palpitation
- (3) Weakness and fatigue
- (4) Fainting on standing

Respiratory

- (1) Sense of choking
- (2) Air hunger

Renal

No symptoms reported.

Neuromuscular

- (1) Dizziness
- (2) Blurring of vision
- (3) Paresthesia
- (4) Drowsiness
- (5) Sweating
- (6) Weakness

Mental Reaction.

Ideation. Ideation is reported as being impaired. Patients have difficulty in thinking, find it hard to concentrate, and are bothered by attempts to carry out set tasks.

Mood. Mood varies. Individuals who are not habituated to marihuana or who dislike the effects of the drug, are depressed

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by C-9. They become fearful, and frequently refuse to take the drug again. Unpleasant effects are accentuated by nausea and vomiting, faintness, dizziness, and weakness on standing. In experienced marihuana users, effects on mood vary with the situation. If patients are observed in small social groups and not intensively examined there is a strong tendency for elation to appear. The patients laugh, giggle, tell pointless jokes, play records, and generally behave in a silly fashion. Under conditions of intensive examination, tendency is for patients to withdraw, and act in a guarded fashion though they remain quiet and cooperative. When doses of 2-2½ mg. are given, experienced marihuana users become fearful and somewhat withdrawn. They state that they are afraid of "going too high" and that they will be unable to "come down."

Affect usually is appropriate to the situation and the stimuli being received.

Stream and Content of Thought. No gross impairment of abstract thinking occurs. So far as one can ascertain, there is no abnormal thought content. Paranoid ideas have not been prominent in our experience.

Psychomotor Activity. Like mood, psychomotor activity varies with the situation and with the individuals. In social situations, outgoing individuals are prone to laugh, dance, giggle and crack many jokes. Patients usually remain detached

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from the situation. They tend to laugh quietly at the outgoing individuals. When the situation is not social, tendency is for all types of patients to withdraw to their rooms and take naps.

Hallucinations and Delusions. Hallucinations and delusions have not yet been observed. Occasionally elementary hallucinations, lights, patterns and colorings on closing the eyes, have been reported.

General Characteristics of C-9 Reaction. Although the mental effects induced by C-9 seems somewhat vague, they are definitely marihuana-like and are so identified by experienced subjects who are well acquainted with the effects of marihuana. Such patients state that the chief differences are slow onset and long persistence of the reaction. Essentially the drug seems to induce a mental state characterized by a peculiar mixture of pleasant sedation plus apprehension and anxiety which has no definite basis. A sensation of being light or floating is frequently reported. Distortion of time sense is often mentioned; time seems to pass more slowly. Some difficulty in vision is present. This is usually described as consisting of slight blurring of vision plus spatial distortion. Distances ordinarily appear to be greater; distortion in form, shape or color is unusual. In addition, there is a sense of heightened sensory perception -- all things look better, feel better and taste better. In the proper situation there is diminution in ego controls which, though not as great as seen with large amounts

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of alcohol, results in somewhat silly, uninhibited behavior. The patients state they are able to enjoy music more, to appreciate taste of food more highly, and to appreciate colors and so on more, than they would without the drug. Although the test situation has precluded any direct observations on sexual drive all patients consistently state that sexual urges would be enhanced in a proper situation.

Symptoms induced by C-9 differs sharply in overall pattern from those induced by LSD-25. In the LSD reaction, nervousness, anxiety and anorexia are prominent. In the C-9 reaction, drowsiness (although mixed with some mild apprehension) and hunger are commonly reported. Atropine-like effects (dryness of the mouth etc.) are prominent with C-9 and not prominent with LSD. Characteristic visual-perceptual distortion, which is so prominent in the LSD reaction, is scarcely mentioned by individuals under C-9. Depersonalization (a feeling that one's body or so part of it is not one's own) is common with LSD, rare under C-9.

Objective Effects. These include:

- (1) Injection of the conjunctivae (red eyes)
- (2) Pseudoptosis (droopy lids -- a sleepy appearance)
- (3) Tachycardia (fast pulse)
- (4) Very fast pulse and marked drop in blood pressure on standing.

No effects of outstanding significance have been observed on body temperature, resting blood pressure, respiratory rate, or in any phase of the neurological examination. Pupils are not dilated. There is no gross motor ataxia and no gross change on sensory

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examination. No laboratory evidence of damage to the liver, kidney or hemopoietic system has been observed after single doses of the drug.

Cardiovascular Effects. The cardiovascular effects of C-9 are also induced by the members of the marihuana group (marihuana itself and parahexyl compounds). They consist essentially of tachycardia and postural hypotension. These effects are evident in two hours and may be present 24 to 48 hours later. They may be present for 24 to 48 hours after the ingestion of doses of 2 to 2.5 mg. The cardiovascular effects are most evident on quiet standing. The resting pulse rate and pulse rate after one and two minutes standing plus blood pressure after one and two minutes standing are very useful indicators of the drug's effects.

Variations. As is the case with all drugs, the degree of effect obtained with a given dose of C-9 varies from individual to individual. In some patients, intense mental effects plus cardiovascular effects, resulting in fainting on standing, may occur with doses as low as 1.5 mg. In other individuals receiving 1.5 mgm., or even 2.0 mgm., very few subjective symptoms and only mild changes in pulse rate and blood pressure will be observed on standing.

Psychosis After C-9. So far, no toxic psychosis has occurred after ingestion of C-9. It is, however, known that other marihuana-like drugs sometimes trigger a toxic psychosis, usually of paranoid type, in susceptible individuals. It is very likely

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that when a sufficient number of patients have had C-9, toxic psychoses may be reported in a few.

Diagnosis. At the present time there is no absolutely certain way of diagnosing C-9 (or marihuana intoxication) in an unknown situation. The diagnosis should be suggested by the combination of conjunctival injection, pseudoptosis, tachycardia, postural hypotension, plus the subjective effects of dryness of the mouth, blurring of vision, drowsiness, change in time sense, spatial perception, and heightened auditory acuity. Negative points of importance include lack of neurological changes and absence of significant effects on respiration, temperature, and resting blood pressure. Differentiation from LSD-25 should be relatively easy (unless a mixture of drugs is given) since pupillary dilatation, accentuation of tendon reflexes and marked visual perceptual distortion are not present during the C-9 reaction. Lack of pupillary dilatation serves to differentiate C-9 from Scopolamine. Alcohol and barbiturates induce definite neurological changes (nystagmus, ataxia in gait and station, but do not induce dryness of the mouth and the characteristic mental changes caused by C-9. The C-9 reaction is not likely to be confused with any of the major psychoses; it might however be confused with anxiety reactions or panic states.

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ACUTE INTOXICATION WITH THE DIETHYLAMIDE OF LYSERGIC ACID (LSD-25)

Definition. Acute intoxication with the diethylamide of lysergic acid refers to the physiological and mental changes produced by the ingestion of that drug. Acute LSD intoxication is characterized by dilatation of the pupils, increased systolic and diastolic blood pressures, increased deep tendon reflexes, decreased superficial skin reflexes, retention of the pupillary reactions to light and accommodation and absence of changes in tests of motor coordination and sensory function. In addition, the drug induces a characteristic train of "mental" symptoms which include, in rough order of appearance, sensation that something is happening to the individual, nervousness and anxiety, peculiar sensations on the skin (electric shocks, hot and cold sensations, insects crawling on the skin, changes in the texture of objects (a blanket feels like a buffalo robe), difficulty in concentrating, rapid rush of thoughts, changes in mood which vary from great elation to severe depression, changes in visual perception (things and people appear to be blurred; people and objects change in size, shape and color), "elementary" hallucinations (perception of lights, colors, diagrams, patterns rapidly changing form, shape and size which are most prominent on closing the eyes, or going into a darkened room), and in extreme cases, true hallucinations (seeing persons or things that are not really present).

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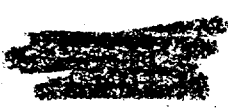
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Despite these experiences, the subject knows who he is, where he is and the date and time.

Variations. The description of LSD intoxication set forth in the definition above includes symptoms observed in individuals who experienced maximal effects from LSD-25. It must be borne in mind that, as is the case with all drugs, the effects of identical doses of LSD vary widely in different individuals. A dose of 75 mcg. may induce only slight nervousness in one individual, while another person will experience marked visual distortions and true hallucinations. In the same individual, the effect may vary, depending upon environmental circumstances. At present, however, all the reasons for the variations in the degree of effect in different individuals are not completely understood.

Effect of dosage. As is the case with other drugs, the larger the dose of LSD, the greater the effect in the same individual under the same circumstances. A person who experiences only mild effects after having received a dose of 75 mcg. of LSD would be expected to experience moderate to marked effects with a dose of 125 mcg., and marked to severe effects with a dose of 150 to 175 mcg. The dose of LSD also affects the time course of the intoxication. The effects appear more quickly and persist longer with the larger doses.

Time course. The first signs and symptoms of LSD intoxication appear 15 to 30 minutes after ingestion of the drug;



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maximal effects are usually evident within two hours. The effects remain maximal until the 4th hour of the intoxication and, thereafter, gradually decline. Symptoms and signs greatly abate after eight hours and are usually completely gone after 16 hours. Occasionally, severe reactions may persist until the 12th or 16th hour after the drug is ingested, and, in certain individuals, symptoms may be reported for several days after ingestion of a single dose of the drug.

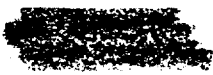
Typical LSD reactions. Typical LSD reactions may be described as mild, moderate, marked or severe on the basis of the mental symptoms experienced.

Mild reaction. A mild reaction consists of a perception on the part of the subject that something has happened; some change, which is difficult to describe, has occurred in the way the subject feels. This change consists chiefly of sensations of apprehension, anxiety and nervousness. Concomitantly, the subject may experience feelings of trembling inside his body of uncomfortable sensations in the stomach or chest, pricklings on the skin, and heaviness in various muscles, particularly the neck. The subject has difficulty in concentrating and carrying out tasks involving intellectual effort. He is, however, able to perform these tasks, though somewhat more slowly than in the undrugged state. Mood, in this grade of reaction, is most frequently one of mild elation and easy laughter. Visual perceptual distortions (changes in shape,

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size, color of persons or objects) do not occur. "Elementary" hallucinations and "true" hallucinations are not present. Insight is retained - the subject realizes that the symptoms he is experiencing are due to the drug.

Example of mild LSD reaction. A negro male, age 40, received 138 mcg. of LSD-25 orally at 8 a.m. At 8:30, pupils had increased 1 mm. in diameter; deep tendon reflexes were unchanged. No subjective symptoms were reported at this time. By 9 o'clock, pupils had increased 2 mm. in diameter and deep tendon reflexes had increased from a barely perceptible jerk to a vigorous, rapid twitch. At 9 o'clock, patient reported sensations of unsteadiness, nervousness and increased salivation. At 10 o'clock, pupils had increased 3 mm. as compared with the pre-drugged state; the knee jerks remained hyperactive. The patient continued to report increased nervousness, unsteadiness and indescribable sensations that things were different. No change in his overt behavior was observed. At 11 o'clock, pupils had increased 4 mm. in diameter; knee jerk had become repetitive on a single light tap. The patient continued to report nervousness; overt behavior remained unchanged. Eight hours after LSD was taken, pupils were 3 mm. larger than prior to ingestion of the drug. Knee jerks were still more active than before the drug, but, by this time, the patient was no longer reporting subjective tensions of any kind and he had begun to read again. The following morning he reported that he experienced no further



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subject^{ive}/sensations after 2 p.m. This is, therefore, an illustration of a very mild reaction to a rather large dose of LSD and despite the occurrence of marked physiological changes.

Moderate reaction. This degree of LSD effect includes all the symptoms listed above under the mild reaction. In addition, the subject experiences changes in visual perception. These consist largely of alteration in the size, shape and color of the subject's own body, or parts of his body, of other people, or of inanimate objects. Mood in this grade of reaction is usually one of slight depression. Ordinarily, a distinct change in overt behavior occurs. The patient stops reading and does not spontaneously carry out any other activity requiring intellectual effort; rather sits quietly by himself. However, he can converse rationally, answer questions accurately, and carry out tasks involving some degree of mental effort, although the time required to carry out these tasks is increased. Occasionally, patients are quite elated, laughing and giggling. Subject is definitely apprehensive; he may perceive a few "elementary" hallucinations (lights, colors possibly forming diagrams and patterns which are most prominent on closing the eyes or going into the dark). True hallucinations do not occur. Subject is "oriented" (knows who and where he is and the day of the month). Insight is retained: the subject realizes that his subjective experiences are due to the drug. He does not report experiencing a sensation that he is another person or that a part of his

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body does not belong to him.

Example of moderate reaction. A white male, age 27, received 75 mcg. of LSD at 9:45 a.m. At 10:15, pupils were dilated 1 mm., and knee jerks had increased. At this time the patient reported sensations that some change was occurring and that he felt nervous and was trembling inside. At 10:45, these sensations were increasing, pupils were now 3 mm. larger than before taking the drug and the knee-jerk had become extremely hyperactive. The patient initially was elated, talked very volubly, but by 12:45, preferred to sit quietly, although he answered questions readily when interviewed. At 12:45, he reported that his vision was blurred; that his hands appeared to change size and shape as he watched them. At times, other people appeared to be quite small and, at other times, extremely large. On closing his eyes the patient saw shimmering white lights. Despite the distortion of his hands, other persons and inanimate objects, he identified the hands as being his own and unerringly identified other objects and other persons. At 4:45 p.m., the patient no longer reported visual distortions, but still was experiencing apprehension and nervousness. These symptoms gradually declined and had completely disappeared by 10 p.m. This, therefore, represents an example of moderate reaction to LSD, since it includes distortions in visual perception as well as anxiety and apprehension. Note that the



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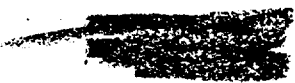
dose in this particular individual was smaller than in the individual with the mild reaction, even though the effect due to the drug was greater.

Marked reaction. The marked reaction includes all the signs and symptoms of the mild and moderate reactions and, in addition, the degree of perceptual distortion is greater and elementary hallucinations are very prominent. True hallucinations do not occur. The subject retains insight and realizes that the effects are due to the drug. In this degree of reaction, the subject frequently reports confusion, even though he retains complete orientation. The feeling of confusion is described variously as being: (1) things appear to be quite unreal; or (2) the patient is fearful of becoming permanently insane; or (3) is fearful that the effects of the LSD will not disappear.

Example of marked reaction. A white male, age 62, received 75 mcg. of LSD at 9:00 a.m. At 9:30, the pupils had increased 2 mm. in size, and knee jerks had become quite hyperactive. At this time the patient reported that he was extremely nervous, was experiencing hot and cold sensations, feelings that insects were crawling on his skin, was trembling, felt unsteady and dizzy, and had some difficulty in breathing. At 11 o'clock, pupils had increased 4 mm. in size, knee jerks had increased greatly in amplitude and had become twitchy and repetitive. Patient now reported that he felt ill, was nauseated, his lips and portions of his skin were numb. He was unsteady, had

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difficulty in breathing, was aware of his heart beat, his hands felt extremely light, his eyesight was markedly blurred and he had difficulty in focusing his vision. On looking at his hands, they became very large or shrank to small size. Other people appeared to be quite small and of red color. At other times, only part of the person was altered. The windows appeared to be wide at the top and narrow at the bottom. The patient was extremely apprehensive; he was afraid that he was going permanently insane. Overt behavior was markedly changed. He jumped at the slightest sounds, stared into space and, from time to time, held up his hands and observed them in a puzzled way. On closing his eyes, he described many colored lights, patterns and diagrams. Despite this, he could answer questions rationally, attributed the effects he was experiencing to the drugs and said that he was afraid that he would not recover. At 12 o'clock, he went into the bathroom, sat on the floor and refused to get up. He would give no explanation of this, but, however, readily talked about mutual experiences, his past life and so on. Later, he said that he could not get up from the floor because one of his legs was gone. Symptoms began to abate about 1 p.m., but marked visual distortions were reported up until 4 p.m. On the following day, he reported that he remained nervous and tense until about 1 a.m., but that he did not see colored lights or experience visual distortion after 4 p.m. This is, therefore,



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an example of a marked reaction to LSD, since it includes nervousness, apprehension, marked visual perceptual distortions, elementary hallucinations and a feeling of depersonalization (loss of his leg). Note that this effect occurred with the same dose which induced only a moderate reaction in another subject.

Marked reaction. The marked LSD reaction includes all the symptoms described under mild, moderate and marked grades and, in addition, true hallucinations occur and patient has at least partial loss of insight (does not realize at all times that the effects he is experiencing are due to the drugs).

Example of marked reaction. A negro male, age 33, received 104 mcg. of LSD at 8 o'clock. By 8:30, pupils had increased 1 mm. in size, but deep tendon reflexes were unaffected. By 9 o'clock, pupils had increased 2 mm. in size and the knee jerk had become greatly increased in amplitude and was twitchy. By 10 o'clock patient was reporting sensations of dizziness, unsteadiness, insects crawling on the skin, pressure in the ears, blurring in vision, difficulty of focusing his eyes, shapes and colors were undergoing rapid alterations. Objects appeared to move in and out as he watched them and his hands felt quite clumsy. By 11 o'clock, all symptoms had become very severe; pupils had increased 4 mm. in diameter and the knee jerks were very great in amplitude. At this time, patient was reporting great anxiety, dizziness, unsteadiness, ^{and} that his hands and feet

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were constantly changing in size and shape. He became unsure whether he was the subject or the interviewer. He reported that he could see the interviewer's heart beating. He saw a doctor attempting to go into the next room, although at the time this was described, no other person was nearby. Voices in the walls were holding conversations, some of which were addressed to the patient. The patient was unable to carry out any tasks requiring intellectual effort. He could not fill out a simple questionnaire, but, however, responded readily to verbal questions. He was extremely apprehensive and fearful that the effects would not abate and that he would be permanently insane. The effects remained intense until 12 o'clock and, thereafter, gradually declined. By 4 o'clock, the patient was reporting only mild anxiety, lack of appetite and a feeling that he was changed in some way. At this time all hallucinations and distortions in visual perception had disappeared. The patient remained somewhat apprehensive until 10 o'clock that night. At this time he went to sleep and on the following morning appeared to be completely normal. This, therefore, is an example of marked reaction to LSD, since the patient experienced true hallucinations and had partial loss of insight.



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